

AMENDMENTS TO THE SPECIFICATION

Please replace paragraphs [0013], [0026], [0035], and [0040] with the following paragraphs rewritten in amendment format.

[0013] Preferably, the firing step is followed by airtight treatment for eliminating the air permeability of the hardened porous solidified layer. A porous insulating layer formed by so-called freeze drying has a very high porosity and, accordingly, often exhibits air permeability between one surface of the layer and the other surface if the layer has a small thickness. Consequently, the porous insulating layer exhibits continuity or its insulation properties is degraded due to water trapped in the layer from the air. Accordingly, the air permeability of the hardened porous solidified layer (porous insulating layer) is eliminated by air treatment after firing. Thus, the insulation properties of the porous insulating layer are prevented from deteriorating. Specifically, the surface of the porous insulating layer is instantaneously exposed to high temperature by using a ~~flushing~~ flashing device or a laser to melt the surface thereof, and thus, the pores in the surface are covered.

[0026] The firing portion 70 of the embodiment comprises a hot plate 74 containing a heater 72. However, the firing portion 70 may comprise a tunnel oven, an infrared lamp, or the like. In the firing portion 70, the solidified layer (porous solidified layer) 76 made porous in the vacuum drying portion 60 is hardened by heating on the hot plate 74. The airtight portion 80 located downstream from the firing portion 70 has a treatment chamber 82 in which the workpiece 1 is placed. The treatment chamber 82 is

provided with a ~~flushing~~ flashing device 84 at the upper portion thereof. The ~~flushing~~ flashing device 84 instantaneously emits heat rays to expose the surface of the porous solidified layer (porous insulating layer) 86 to high temperature, thereby melting the surface of the porous insulating layer 86 to cover the pores in the surface (not shown in the figure). The ~~flushing~~ flashing device 84 may be replaced with a laser-beam emitter or the like to instantaneously expose the surface of the porous insulating layer 86.

[0035] The resulting porous insulating layer 86 has a porosity of 90% or more and, accordingly, the dielectric constant can be reduced. However, since the porous insulating layer has a very large porosity, if the thickness of the porous insulating layer 86 is small, the porous insulating layer 86 has an air permeability and reduces the insulating properties with time, due to water trapped from the air or the like. Accordingly, in step 110, the porous insulating layer 86 is subjected to airtight treatment. More specifically, the workpiece 1 having the porous insulating layer 86 is conveyed to an airtight treatment chamber 82 of the airtight treatment portion 80, and the surface of the porous insulating layer 86 is instantaneously exposed to a high temperature with the ~~flushing~~ flashing device 84. Thus, the surface of the porous insulating layer 86 is melted to cover the pores in the surface, so that the air permeability is lost to complete an airtight porous insulating layer (step 112).

[0040] A TEOS benzene solution containing 10 percent by weight of TEOS was prepared, and a porous insulating layer 86 was formed to a thickness of about 200 nm on a semiconductor substrate, as in Example 1. The surface of the porous

insulating layer 86 was exposed to a temperature of 800°C for 10 ms by ~~flushing~~
flashing device 84 for airtight treatment. The relative dielectric constant of the resulting
porous insulating layer 86 was 1.3. Also, the relative dielectric constant measured after
24 hours on the following day was 1.3, and was, thus, not changed.